

In the Claims

1. (currently amended): A process to produce an intermediate pressure steam from a high temperature process stream resulting from an aromatic carboxylic acid production process, said process comprising:
 - (a) recovering thermal energy from at least a portion of said high temperature process stream in a first heat transfer zone to produce a low pressure steam; and
 - (b) compressing said low pressure steam in a compression zone to produce said intermediate pressure steam; wherein said intermediate pressure steam has a pressure in the range from about 50 psig to about 260 psig.
2. (original): A process according to claim 1 wherein said low pressure steam has a pressure from about 0 psig to about 40 psig.
3. (canceled)
4. (original): A process according to claim 1, 2 or 3 wherein said compression zone comprises at least one compression device selected from the group consisting of a centrifugal compressor, a positive displacement compressor, and a steam ejector.
5. (original): A process according to claim 4 wherein said intermediate pressure steam is superheated and wherein at least a portion of the superheat is removed from said intermediate pressure steam.
6. (original): A process according to claim 1, 2 or 3 wherein said compression zone comprises at least one steam ejector.

7. (original): A process according to claim 6 wherein said steam ejector has a compression ratio of about 1.2 to about 2.0.
8. (original): A process according to claim 7 wherein said high temperature process stream is at a temperature of greater than 100 °C.
9. (original): A process according to claim 1 wherein said high temperature process stream is produced in a carboxylic acid production process and wherein the high temperature process stream is generated from an oxidation reactor, high pressure distillation column, vapor generated by an oxidation reactor, a water removal column, vapor generated by the crude TPA crystallizer, purified TPA crystallizer described, or vapor generated by purified TPA crystallizers.
10. (original): A process according to claim 1 wherein said high temperature process stream is produced in a terephthalic acid production process.
11. (currently amended): A process to recover thermal energy from a high temperature process stream resulting from an aromatic carboxylic acid production process, said process comprising:
- (a) recovering thermal energy from at least a portion of said high temperature process stream in a first heat transfer zone to produce a low pressure steam;
 - (b) compressing said low pressure steam in a compression zone to produce an intermediate pressure steam; wherein said intermediate pressure steam has a pressure in the range from about 50 psig to about 260 psig;

(c) recovering thermal energy from at least a portion of said intermediate pressure steam in a second heat transfer zone to produce steam condensate; and

(d) optionally, recycling at least a portion of said steam condensate to said first heat transfer zone.

12. (original): A process according to claim 11 wherein said low pressure steam has a pressure from about 0 psig to about 40 psig.

13. (canceled)

14. (original): A process according to claim 11, 12 or 13 wherein said compression zone comprises at least one compression device selected from the group consisting of a centrifugal compressor, a positive displacement compressor, and a steam ejector.

15. (original): A process according to claim 14 wherein said intermediate pressure steam is superheated and wherein at least a portion of the superheat is removed from said intermediate pressure steam.

16. (original): A process according to claim 11, 12 or 13 wherein said compression zone comprises at least one steam ejector.

17. (original): A process according to claim 16 wherein said steam ejector has a compression ratio of about 1.2 to about 2.0.

18. (original): A process according to claim 17 wherein said high temperature process stream is at a temperature of greater than 100°C.

19. (original): A process according to claim 17 wherein said high temperature process stream is produced in a carboxylic acid production process and wherein

the high temperature process stream is generated from an oxidation reactor, high pressure distillation column, vapor generated by an oxidation reactor, a water removal column, vapor generated by the crude TPA crystallizer, purified TPA crystallizer described, or vapor generated by purified TPA crystallizers.

20. (original): A process according to claim 17 wherein said high temperature process stream is produced in a terephthalic acid production process.

21. (currently amended): A process to recover thermal energy from a high temperature process stream resulting from an aromatic carboxylic acid production process, said process comprising:

(a) recovering thermal energy from at least a portion of said high temperature process stream in a first heat transfer zone to produce a low pressure steam;

(b) compressing said low pressure steam in a compression zone to produce a intermediate pressure steam; wherein said compression zone comprises at least one steam ejector; wherein said intermediate pressure steam has a pressure in the range from about 50 psig to about 260 psig;

(c) recovering thermal energy from at least a portion of said intermediate pressure steam in a second heat transfer zone to produce steam condensate; and

(d) optionally recycling at least a portion of said steam condensate to said first heat transfer zone.

22. (original): A process according to claim 21 wherein said low pressure steam has a pressure from about 0 psig to about 40 psig.

23. (canceled):
24. (original): A process according to claim 21 wherein said steam ejector has a compression ratio of about 1.2 to about 2.0.
25. (original): A process according to claim 21 wherein said high temperature process stream is at a temperature of greater than 100 °C.
26. (original): A process according to claim 21 wherein said high temperature process stream is produced in a carboxylic acid production process and wherein the high temperature process stream is generated from an oxidation reactor, high pressure distillation column, vapor generated by an oxidation reactor, a water removal column, vapor generated by the crude TPA crystallizer, purified TPA crystallizer described, or vapor generated by purified TPA crystallizers.
27. (original): A process according to claim 21 wherein said high temperature process stream is produced in a terephthalic acid production process.
28. (currently amended): A process to recover thermal energy from a high temperature process stream, said process comprising:
- (a) recovering thermal energy from at least a portion of said high temperature process stream in a first heat transfer zone to produce a low pressure steam;
 - (b) compressing said low pressure steam in a compression zone to produce an intermediate pressure steam; wherein said compression zone comprises a compressor; wherein said intermediate pressure steam has a pressure in the range from about 50 psig to about 260 psig;

(c) removing at least a portion of superheat resulting from compression from said intermediate pressure steam;

(d) recovering thermal energy from at least a portion of said intermediate pressure steam in a second heat transfer zone to produce steam condensate; and

(e) optionally, recycling at least a portion of said steam condensate to said heat transfer zone.

29. (original): A process according to claim 28 wherein said low pressure steam has a pressure from about 0 psig to about 40 psig.

30. (canceled)

31. (original): A process according to claim 28, 29 or 30 wherein said compression zone comprises at least one compression device selected from the group consisting of a centrifugal compressor, and a positive displacement compressor.

32. (original): A process according to claim 31 wherein said high temperature process stream is at a temperature of greater than 100 °C.

33. (original): A process according to claim 28 wherein said high temperature process stream is produced in a carboxylic acid production process and wherein the high temperature process stream is generated from an oxidation reactor, high pressure distillation column, vapor generated by an oxidation reactor, a water removal column, vapor generated by the crude TPA crystallizer, purified TPA crystallizer described, or vapor generated by purified TPA crystallizers.

34. (original): A process according to claim 28 wherein said high temperature process stream is produced in a terephthalic acid production process.

35. (currently amended): A process to recover thermal energy from a high temperature process stream, said process comprising:

(a) oxidizing an aromatic feedstock with a reaction mixture in a reaction zone to form an aromatic carboxylic acid-rich stream and a gaseous mixture;

(b) removing in a separation zone a substantial portion of a solvent from said gaseous mixture to form said high temperature process stream and a solvent rich stream;

(c) recovering thermal energy from at least a portion of said high temperature process stream in a first heat transfer zone to produce a low pressure steam;

(d) compressing said low pressure steam in a compression zone to produce an intermediate pressure steam; wherein said intermediate pressure steam has a pressure in the range from about 50 psig to about 260 psig; and

(e) recovering thermal energy from at least a portion of said intermediate pressure steam in a second heat transfer zone to produce steam condensate;

(f) optionally recycling at least a portion of said steam condensate to said heat transfer zone.

36. (original): A process according to claim 35 wherein said low pressure steam has a pressure from about 0 psig to about 40 psig.

37. (canceled):
38. (original): A process according to claim 35, 36 or 37 wherein said compression zone comprises at least one compression device selected from the group consisting of a centrifugal compressor, a positive displacement compressor, and a steam ejector.
39. (original): A process according to claim 38 wherein said intermediate pressure steam is superheated and wherein at least a portion of the superheat is removed from said intermediate pressure steam.
40. (original): A process according to claim 35, 36 or 37 wherein said compression zone comprises at least one steam ejector.
41. (original): A process according to claim 39 wherein said steam ejector has a compression ratio of about 1.2 to about 2.0.
42. (original): A process according to claim 40 wherein said high temperature process stream is at a temperature of greater than 100°C.
43. (original): A process according to claim 35 wherein said high temperature process stream is produced in a carboxylic acid production process and wherein the high temperature process stream is generated from an oxidation reactor, high pressure distillation column, vapor generated by an oxidation reactor, a water removal column, vapor generated by the crude TPA crystallizer, purified TPA crystallizer described, or vapor generated by purified TPA crystallizers.
44. (original): A process according to claim 35 wherein said high temperature process stream is produced in a terephthalic acid production process.